

**Memorandum of Understanding**  
**between**  
**US Universities & Accelerator Laboratories**  
**and**  
**Indian Universities & Accelerator Laboratories**  
**concerning**  
**Collaboration on R&D for Various Accelerator Physics and High**  
**Energy Physics Projects**

January 9, 2006

**1. Introduction**

**1.1 General Description**

This Memorandum of Understanding (MOU) establishes a collaboration framework between various US and Indian Accelerator Laboratories and Universities, hereinafter referred to as the "Parties", to pursue coordinated R&D in areas of mutual interest pertaining to accelerator and high energy physics projects. This agreement between the Parties is made to further the objectives of any existing national and international collaborations, and shall not alter those collaborations. This MOU between the Parties is not a legal contractual obligation on the part of any of the institutions that are a party to the agreement.

**1.2 Objective**

The objective of this MOU is to document the terms under which work of the Parties is to be performed.

**1.3 Scope**

This MOU covers work to be performed by the Parties in the furtherance of the goals of the collaborations and the specific R&D tasks within the topics of collaboration.

**1.4 Initial List of Participating Institutions**

The following is a list of the Institutions that are a party to the collaboration. The Parties agree that after mutual consultation, they would favorably consider admitting new partner institutions from the USA and India who want to contribute towards the objective of this Agreement.

#### **1.4.1 US Institutions**

Fermi National Accelerator Laboratory, Batavia, (Fermilab)  
Stanford Linear Accelerator Center, Stanford, (SLAC)  
Thomas Jefferson National Accelerator Facility, Newport News, (TJNAF)  
Laboratory of Elementary Particle Physics, Cornell University

#### **1.4.2 Indian Institutions**

Raja Ramanna Centre for Advanced Technology, Indore , (RRCAT)  
Variable Energy Cyclotron Centre, Kolkata, (VECC)  
Inter-University Accelerator Centre, New Delhi (IUAC)  
Tata Institute for Fundamental Research, Mumbai (TIFR)  
Bhabha Atomic Research Centre, Mumbai (BARC)  
University of Delhi, Delhi (DU)

### **1.5 Initial List of Topics for Collaboration**

The following is a list of the major topics of collaboration. Additional topics may be added by agreement of the collaboration coordinating committee, see Sec 2.2. The details of collaboration on these topics will be discussed in Addendum to this MOU.

#### **1.5.1 Accelerator for ILC**

#### **1.5.2 Superconducting Radio Frequency (SRF) Science and Technology including Test facilities and High Current proton Drivers**

#### **1.5.3 General Accelerator Science and Technologies, including conventional and free electron lasers.**

#### **1.5.4 Superconducting Materials R&D for RF related projects**

#### **1.5.5 Development of Novel & Large Particle Detectors**

#### **1.5.6 Neutrino Physics**



## **2. General Provisions**

### **2.1 Terms and Conditions**

All the Parties to this agreement have contracts with their respective funding agencies and/or governments. All work performed by any of the Parties under terms of this MOU will be consistent with the terms and conditions of their respective contracts/programs.

### **2.2 Organization**

Each of the Parties to this agreement shall appoint a representative to a Collaboration Coordinating Committee (CCC) to oversee the collaboration setup by this MOU. The CCC shall choose two co-chairs, one from India and one from the USA, who will be responsible for fulfilling the goals of the collaboration. The CCC shall be responsible for admitting new Institutions to the collaboration and for modifications to the list of topics for collaborative effort under the terms of this agreement. Specific collaborative tasks done under the mantle of this collaboration shall be described in addenda to this MOU and the CCC shall be responsible for the scope and setup of these tasks within the framework of this MOU and for generating the MOU addenda describing the work and mechanisms for completing the work.

### **2.3 Funding**

Unless otherwise agreed in writing, each Party shall be responsible for funding their participation in cooperative activities. Exact composition of the activities is subject to and dependent upon the availability of appropriated funds, personnel, and resources. Additional, specific financial arrangements between parties will be negotiated on a case to case basis, as permitted by relevant law and regulation.

### **2.4 Reporting**

Reporting of progress on the various tasks under this MOU shall be done at least once a year through the CCC. The Parties will coordinate transfer of information to allow the CCC to maintain appropriate records of budgets, schedules, costs, and progress towards established milestones. These records will be the basis for various reviews that may be established by the Parties or their funding agencies.



## **2.5 Ownership of Equipment**

Title to any equipment purchased or fabricated under the terms of this MOU shall vest with the institution that funded the acquisition of the equipment unless otherwise agreed to in writing. Such equipment is subject to the property management requirements of the institution that acquired the equipment.

## **2.6 Intellectual Property**

Rights with regard to intellectual property are regulated by the appropriate policies at the various institutions. "Intellectual property" includes but is not limited to inventions, technical data, and software. Intellectual property created exclusively by one party shall be exclusively the intellectual property of that party. Intellectual property created by collaboration between parties shall be the joint intellectual property of the Parties concerned.

Rights with regard to commercialization of exclusively developed or created intellectual property are retained by the party that exclusively developed or created that intellectual property; commercialization of intellectual property jointly developed shall be handled as follows: an agreement to commercialize and the sharing of any revenues/royalties will be made prior to submitting a patent application. The general guideline for any sharing of revenues/royalties is that the shares of revenue/royalty from any Intellectual Property will be divided in accordance with the contribution toward development and commercialization that each party makes. It is recognized that the parties are bound by the Terms and Conditions of their contracts with their funding agencies. Therefore nothing in this instant agreement shall be construed to supersede the terms and conditions of the parties' contract with their funding agencies.

## **2.7 Pre-Publication Review**

All work covered by this MOU will be unclassified. Publications will be generally collaborative, although each party will have the right to publish information in part or in whole, independent of the other parties, if it has been dominantly involved in a particular activity. The Parties will however, circulate any papers related to this MOU to the other parties in order to reconcile any pre-publication Intellectual Property concerns. The receiving parties should provide a response, including any possible objections (due to release of proprietary information, etc.), within a 30 day review period. If no comments are received the party seeking publication may move forward to publish. If comments are received the concerned

Parties should discuss and reconcile their differences (with the help of the CCC, if necessary).

## **2.8 Amendments**

This MOU may be modified or amended from time to time by written agreement of all Parties to the collaboration.

## **2.9 Addenda**

It is anticipated that Addenda will be the primary mechanism for defining the scope of work and deliverables. Addenda shall be executed by the Parties affected by the Addenda.



### **3. Plan of Work**

#### **3.1 Scope of Work**

The scope of the work performed under this MOU includes all activities necessary to carry out the specific R&D tasks defined by the collaboration.

The specific scope of activities carried out by the Parties under this MOU will be described in addenda to this MOU.

#### **3.2 Statement of Work**

Under this MOU, the Parties will carry out various activities related to the program defined by the coordinating committee. The specific statement of work carried out by the Parties under this MOU will be described in addenda to this MOU. This could include elements of design and modeling, development of advanced technologies through appropriate R&D, design and production engineering of systems and components, procurement and fabrication of prototypes, cost and schedule estimation, and preparation of reviews and documentation etc.

#### **3.3 Organization of Work**

The specific organization of work to be carried out by the Parties under this MOU will be described in addenda to this MOU, and elements of the specific work will be defined by the CCC and the Institutions involved in the work through mutual discussions.

#### **4. Execution**

##### **4.1 Duration and Effective Date**


This MOU shall be operative for a period of five years and shall become effective upon the date of last signature executing this document.

##### **4.2 Closure/Extension of MOU**

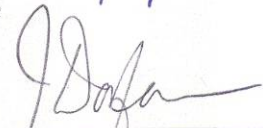
Each Party to this agreement may withdraw from this agreement by giving the coordinating committee 30 days written notice. The MOU may also be terminated by mutual agreement of all the Parties to the MOU. The MOU may also be extended for a further period of five years through mutual agreement between the parties.

#### 4.2 Approvals


The following concur in the terms of this Memorandum of Understanding:

  
Piermaria Oddone, Director, FNAL

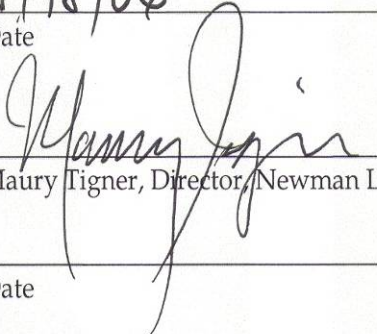
1/9/05  
Date

  
Jonathon Dorfman, Director, SLAC

1/23/06  
Date

  
Christoph Leemann, Director, TJNAJ

1/18/06  
Date

  
Maury Tigner, Director, Newman Lab


Date

Date

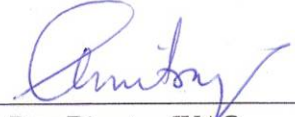
Date

  
Vinod C. Sahni, Director, CAT

March 8, 2006  
Date

  
Bikash Sinha, Director, VECC

March 9, 2006  
Date

  
Amit Roy, Director, IUAC

March 9, 2006  
Date

  
S. Bhattacharya, Director, TIFR

April 17, 2006  
Date

  
S. Banerjee, Director, BARC

March 14, 2006  
Date

  
Deepak Pental, Vice Chancellor, DU

April 10, 2006  
Date